Draft PSD Permit Comments

1. It is our understanding that the best available control technology (BACT) analysis for the boiler concluded that sorbent injection would be used as part of the control of $PM_{2.5}$ emissions. Condition 2.8 of the draft PSD permit does not include this control technology along with the fabric filter baghouse. The final PSD permit should include all controls that will be installed and operated as a result of the BACT analysis.

The Final Permit Should Include All Controls That Will Be Installed and Operated as a Result of BACT

The EPA has provided a comment indicating that Condition 2.8 of the draft permit should include sorbent injection control technology since the BACT analysis concluded that sorbent injection would be used as part of the control of $PM_{2.5}$ emissions. While Condition 2.8 is written regarding control of filterable PM, and sorbent injection would control condensable PM, the basis of the comment is sound. The applicant has no objection to inclusion of permit conditions specifying installation of the control technologies for control of pollutants as proposed by the applicant and affirmed by the Georgia EPD. The following is an example modification to Condition 2.7 of the draft permit with the modification indicated in bold.

2.7 The Permittee shall install and operate and operate, as BACT for H_2SO_4 **and $PM_{2.5}$** on coal fired boiler S1, a Duct Sorbent Injection System.

2. It is our understanding that the BACT analysis for the boiler did not consider Integrated Gasification Combined Cycle (IGCC) as a potentially available control technology. However, in at least one federal permitting action, IGCC was considered an available control option in the BACT analysis for a facility proposed to generate electricity from coal. See Prairie State Generating Company (Illinois). In a recent decision, the EPA Environmental Appeals Board (EAB) remanded a permit because it did not contain an adequate justification for excluding IGCC from the BACT analysis for a coal-fired EGU. See Desert Rock Energy Company, LLC, PSD Appeal Nos. 08-03 et al., Slip. Op. at 76-77 (EAB Sept 24, 2009). The EAB concluded that the permitting record in that case did not support the permitting authority's conclusion that IGCC "redefines the source" and noted that the use of the phrase "innovative fuel combustion techniques" appears to be "intended to broaden the definition of BACT so that the production of gas from coal via gasification would generally be considered in the BACT analysis." Id. at 76-78 n. 82 Consistent with the EAB's analysis in this opinion, the record for the final PSD permit should reflect consideration of IGCC as a potentially available control option, or thoroughly explain and support a decision to not consider IGCC as a control option.

The BACT Analysis for the Main Boiler Did Not Consider Integrated Gasification Combined Cycle (IGCC)

The EPA comments that, consistent with recent Environmental Appeals Board (EAB) decision and analysis on this issue, "the record for the final PSD permit should reflect consideration of IGCC as a potentially available control option, or thoroughly explain and support a decision to not consider IGCC as a control option." The applicant notes that, while the EAB's actions may influence or inform the federal agency, they have no legal significance in Georgia. That is especially true in this case, as the Georgia Court of Appeals has recently held that a similar pulverized coal-fired power plant, the Longleaf Energy Associates, LLC facility, was not required to include IGCC within the scope of its pollution control technology review. The Georgia Court of Appeals' decision controls in this instance. Notwithstanding this clear decision, and in order to demonstrate why the consideration of IGCC would not affect the terms or conditions of the Draft Permit, the applicant is now preparing an IGCC impact analysis for Plant Washington. This analysis will be submitted to the Georgia EPD in the near future.

3. Condition 2.16 includes the detailed emission limitations that resulted from the BACT analysis for the auxiliary boiler; however, the averaging times have not been included as they were in Condition 2.13 (main boiler). It is our understanding from the permitting note on page 7 of the draft permit, that the averaging times of these limits are dictated by the test method. The final PSD permit should be consistent with the information described in the preliminary determination.

Emissions Limitations for the Auxiliary Boiler

The EPA comments that the averaging times for the auxiliary boiler limits were not included in Condition 2.16 of the draft permit, as they were for Condition 2.13 of the draft permit for the main boiler. The applicant has no objection to the inclusion of the averaging times for the auxiliary boiler limits as proposed by the applicant and affirmed by the EPD. Specifically, compliance with the proposed permit limits will all be by stack testing, which will essentially be 3 hour limits except for SO_2, which will be an as fired fuel analysis. However, the applicant notes that the number of expected hours of operation of the auxiliary boiler are small and corresponding ambient air quality impacts from use of the auxiliary boiler will be minimal.

4. The preliminary determination (page 65) summarizes the BACT analysis for the emergency generator and fire water pump. This section proposes NSPS 40 CFR Part 60 Subpart IIII emission limits as BACT limits for the majority of the pollutants. However, it does not seem that these emission limits are included in the draft PSD permit. The final PSD permit should include the numeric emission limits that were determined by the department to be BACT for the emergency generator and fire water pump.

BACT Analysis for the Emergency Generator and Fire Water Pump

The EPA comments that the final permit should include the numeric emission limits determined as BACT for the emergency generator and fire water pump. The applicant has no objection to the inclusion of the emission limits in the final permit. In fact it is likely the only units that will be commercially available when the facility is constructed will be NSPS compliant. These units are expected to operate only during periodic maintenance and during periods of upset or malfunction. Therefore, corresponding ambient air quality impacts from use of this equipment will be minimal.

5. In a letter dated May 19, 2009, the applicant provided supplemental information to amend their $PM_{2.5}$ BACT analysis. This letter includes emission limitations for several material handling point sources. The applicant proposed these emission limitations as BACT for the filterable $PM_{2.5}$ emissions; however, these emission limits do not seem to be included in the draft PSD permit. The final PSD permit should include all the lb/hr emission limits listed in Table F-13 of this letter.

$PM_{2.5}$ BACT Analysis

The applicant does not object to the inclusion of the referenced lb/hr emission limits. However, the applicant does request that compliance monitoring for material handling sources be limited as specified in the draft permit comment response prepared by the applicant and submitted to the Georgia EPD on October 27, 2009. Comments prepared in response to draft permit Condition 6.6 and 6.8 discuss the difficulty in testing of some of the material handling sources. These smaller baghouses do not exhaust out of a stack but have side vents. This makes testing these units by standard EPA methods impractical, potentially requiring the construction of a temporary stack. In these cases, it is proposed that compliance will be demonstrated by a performance specification as supplied by the vendor of the equipment. These emission sources are small sources of $PM_{2.5}$ emissions. Therefore, corresponding ambient air quality impacts from these emission sources will be minimal.

Air Quality Analyses Comments

1. The impact modeling analyses used the Georgia Environmental Protection Division (GEPD) processed 1987-1991 Macon, GA meteorological data. These data appear to have been processed using surface characteristics within the previously recommended 3-km radius of the measurement location. The assessment of these data representativeness is a general, qualitative comparison that is not sufficient to demonstrate the Macon measurements as representative of the project location. The following comments are associated with the provided representative assessment. [Note: Because the roughness parameter is the most important for the impact assessment, the following addresses this parameter.]

    a. The surface characteristics for the project location were estimated based on the planned as-built configuration of the plant and not on the current land cover. The acceptability of the analyses provided depends on the how closely the estimated surface characteristics agree with the final constructed plant.

    b. The surface characteristics for the Macon meteorological measure site and that of the project site were based on aerial photographs for four sectors. This assessment appears to only consider the average heights of the trees and buildings. The aerial photographs do not provide these heights so the source of this information should be provided.

    c. A qualitative assessment of roughness value less than or equal to 1.0 was provided. The area in each sector included in the various land covered categories was not considered. A quantitative assessment of the roughness conditions (*i.e.*, AERSURFACE program output) is needed.

Meteorological Data Discussion

The EPA comments on the representative assessment conducted of the meteorological data used in the modeling analysis for Plant Washington. The EPA comments that a more quantitative assessment, using the AERSURFACE program, is needed. The first meeting regarding Plant Washington was held with the Georgia EPD on November 30, 2007. At this meeting, the applicant presented a modeling protocol (attached). The meteorological data to perform the assessment was provided by the EPD using the AERMET processor and inserting site surface characteristics (Albedo, Bowen, and Surface Roughness) values developed from inspection of aerial photos and using the tabular values provided in the AERMET guidance document for the various land use categories. This was the only means available to make this assessment since the modeling work for Plant Washington was initiated prior to the finalization of AERSURFACE (issued on January 9th 2008). The parameters selected for these characteristics are based on the qualitative assessment of the topography (both existing and what it will be when Plant Washington

is constructed) using the published tables listed in the AERMET users guide (Tables 4-2, 4-3 & 4-4). The comparison table listed in the application (Table 5-4) lists average heights of trees based on a visual observation but this factor was not used in the assessment. The land use was compared to the categories listed in the user guides (primarily Deciduous forest, Coniferous forest, cultivated land, or grassland). The surface roughness for these land uses listed in the table are the ones used for processing of the meteorological data. The area in Washington County where the plant will be located is currently a combination of cleared area, cultivated coniferous forest or existing Deciduous forest. After construction of Plant Washington most of the inner portions of Sectors 2 and 3 as shown in Figure 5-4 of the application will be cleared for construction of the plant. For the most part these areas are already flat offering little wind resistance corresponding to a surface roughness of 0.2 and 0.1 for Sectors 2 & 3 respectively. These values were derived from the user guide tables matching them to land use categories of swamp and desert shrubland which would have similar surface characteristics. For Sectors 1 (except for the southern edge) and 4 away from the immediate site these areas will remain a combination of coniferous and deciduous forest which is designated in the user guide of a surface roughness of 1 and 1.15 for sectors 1 and 4 respectively.

2. The application indicates the modeling was performed using the "worst case base load conditions, which will occur most of the time". Reduced load and startup conditions were modeled as separate analyses. Only 40 percent reduced load operation was considered with the assumption that the emissions and exit flow rate would be 50 percent of the previously modeled values (*i.e.*, no change in exit temperature). All anticipated operational loads, and their applicable emission rates, exit velocities, and exit temperatures, should be provided and included in this impact analyses.

   The modeling of the startup emissions assumed, for each 24-hour period, that the boiler always starts at 5 AM, the auxiliary boiler operates only from 1 AM to 10 AM, and the boiler is at full load at 7 PM. The reason this 24-hour schedule was selected and considered to provide worst case impacts should be provided.

Load Condition Modeling and Startup Modeling Analysis

The permit application included a reduced load analysis of 40% load since that is the minimal operational load at which the boiler could be operated while maintaining proper operating conditions for emissions control equipment, based on discussions with an engineering design company. Long term operation at reduced load is not an anticipated occurrence. Plant Washington is planned to be a base load facility and operating at near peak conditions most of the time. However it is possible during lower demand months to operate at a reduced load. There is no set level at which reduced load operating conditions can physically occur (only a minimum sustained level, 40%). Therefore an evaluation of each and every load condition of the boiler is impractical. Table 5-11 of Section 5 of the permit application demonstrated that the modeling results at 40% operational load were lower than those found from operation at 100% load.

Additional model runs were made that further verify that worst case conditions (greatest environmental impact) occur during full load conditions. The modeling indicates a clear progression of higher ground level concentrations for higher load conditions. Therefore the analysis presented in the application of 100% load represents the worst case load conditions for modeling results.

Regarding the EPA's comments about the time of day selected for the plant startup modeling assessment, the actual time of day that a plant starts up can be influenced by many factors, not the least of which includes coal availability, completion of the required maintenance, availability of necessary personnel to manage the start up, the ability of the electrical grid to absorb the generated power, and the requirements of the grid for the power. All these factors suggest the time of startup could be anytime of the day. However, typically a power plant is operated at full load during peak demand periods of the day which include the evening hours. Beginning the start up sequence at midnight meets this demand by having the power plant at full capacity during the evening hours, which is typically one of the peak power demand periods of the day.

The EPA comment asks why this sequence would yield worst case results. The time period was not selected to achieve worst case results from a meteorological stand point but from an actual occurrence standpoint. Since wind velocity tends to be lower at night and highest during the afternoon hours from a meteorological standpoint, a startup in the afternoon would potentially provide higher ground level concentrations since there will be less dispersion during the night when the main boiler is starting up. A startup modeling assessment was repeated starting the sequence in the mid-afternoon (2PM), and results of that run show that for PM_{10} results remained relatively constant, SO_2 ground level concentrations decreased, and CO ground level concentrations increased when compared to the early morning startup scenario included in the permit application. This second start up scenario would then bring the main boiler up during the other typical daily peak demand period (the morning hours). These results demonstrate that a modeling evaluation of startup during the afternoon hours also produces acceptable modeling results.

3. Use of an interim significant impact level (SIL) as a screening tool for $PM_{2.5}$ air quality analysis prior to EPA's promulgation of the $PM_{2.5}$ SILs will necessitate a demonstration for the administrative record by the GEPD that their interim SILs represent reasonable de minimis values. Simply highlighting the fact that the interim $PM_{2.5}$ SILs used by GEPD are EPA's proposed values is not an acceptable demonstration. At a minimum, the GEPD should express in the permit record an independent judgment whether EPA's proposal provides an adequate rationale and record to establish the interim values as de minimis values for $PM_{2.5}$ impacts in the area of concern.

Significant Impact Level (SIL) for $PM_{2.5}$

The EPA has commented that use of EPA's proposed SIL values for $PM_{2.5}$ are acceptable so long as the EPD expresses in the permit record an independent judgment that EPA's proposed values are acceptable. A review of the September 21, 2007 proposed rule, *40 CFR Parts 51 and 52 Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$)—Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC*), indicates that Option 3 was derived from the ratio of the $PM_{2.5}$ NAAQS to the PM_{10} NAAQS for both the 24-hr and annual values as shown below;

$PM_{2.5}$ Annual SIL = 15 $\mu g/m^3 \div 50\ \mu g/m^3 \times 1\ \mu g/m^3$ (PM_{10} Annual SIL) = 0.3 $\mu g/m^3$ Annual Proposed $PM_{2.5}$ SIL

$PM_{2.5}$ 24-hr SIL = 35 $\mu g/m^3 \div 150\ \mu g/m^3 \times 5\ \mu g/m^3$ (PM_{10} Annual SIL) = 1.2 $\mu g/m^3$ 24-hr Proposed $PM_{2.5}$ SIL

The rationale provided in the preamble documentation to the September 21, 2007 proposed rule regarding derivation of the proposed SILs is adequate in order to preserve the air quality in the region. Those values used in the modeling assessment for Plant Washington were the most stringent (Option 3) of the proposed SIL values, and are consistent with the derived values for PM_{10} SILs. Both the PM_{10} established annual SIL and the proposed Option 3 $PM_{2.5}$ annual SIL are approximately 2% of the annual NAAQS standards for those pollutants, and both the PM_{10} established 24-hr SIL and the proposed Option 3 $PM_{2.5}$ 24-hr SIL are approximately 3% of the 24-hr NAAQS standards for those pollutants.

4. The following comments are associated with the inventory of other sources used in the cumulative national ambient air quality standards (NAAQS) and PSD increment compliance modeling.

   a. The 20D procedure is used to identify sources that could be considered for elimination. It should not be used without review and consideration of their proximity to other emissions sources. Confirmation is needed that all sources within the significant impact area were included in the PSD increment and NAAQS impact modeling.

   b. Confirmation is needed that the modeled emissions for the PSD increment expanding units were associated with the actual emissions on the major source baseline date or the difference between those actual emissions and the current actual or allowable emissions.

   c. The minor source baseline date used to identify increment-affecting emission sources should be provided. Because the appropriate minor source baseline date is specific to the affected baseline area(s), confirmation is needed that all modeled PSD Class II receptors were within Washington County.

NAAQS and PSD Increment Emissions Inventory

A thorough review of all off site SO_2 emissions sources within 56 km of the site (SIA plus 50 km) was completed to identify those sources which should be included in the NAAQS and PSD Increment SO_2 models. The emission sources in the area were compiled using the historic EPD spreadsheets that track increment consumers, Title V permits, SIP permits, PSD permits, and one additional data source the EPA Envirofacts website. The EPA Envirofacts website identifies all plants which are sources of air emissions in an individual county. This system was queried for each county that is located within 56 km of the site. Each source was then mapped and a distance was calculated to determine if individual sites were within 56 km of Plant Washington. Those beyond this distance were not included in the analysis.

The above review did not find any off site emissions sources within the projects Significant Impact Area (5.6 km). Had any sources within the SIA been identified they could not have been screened out using the "20 D Rule". The "20D Rule", which allows for the screening out of off site sources which will have negligible impact on the modeling results, was only applied to sources that were beyond the SIA but within the total modeled off site data retrieval area (56 km). The "20D rule" allows for the elimination of any sources for which plant wide allowable emissions measured in tons per year, are less than 20 times the mean distance (km) from the source being modeled. For the annual period the distance is taken from the source to the outer edge of the SIA. For the short term sources D is the distance to the plant itself.

Because a single SO_2 model with both short term and long term averaging was completed the 20D approach was limited to the more conservative distance from the off site source to the SIA and not to the plant. This technique was used to screen out several small sources. The 20D rule was applied to each individual plant except in those cases where the plants were within 2 km of each other. If the plants were located within 2 km of each other their SO_2 emissions were combined for comparison to the 20D level. These sources were identified by mapping all identified sources to identify all those that were within 2 km of each other.

For simplicity the same emissions used in the NAAQS models (potential to emit) were used for the PSD increment model for all PSD consumers. Potential emissions for each source were calculated based on regulatory allowable emission rates. For fuel burning sources the maximum short term emission rate was determined by calculating the maximum sulfur content in the fuel being burned (based on the units maximum fuel rating from its latest Title V permit application and maximum sulfur content allowed by permit) and then assuming 100% of the sulfur contained in the fuel is converted to SO_2.

The SO_2 PSD increment modeling included only 5 increment expanders which were modeled at a total emission rate of 0.68 lb/hr. These are the 4 dryer stacks (each modeld at 0.1 lb/hr) and a boiler (0.28 lb/hr) located at the Temple-Inland particleboard plant in Thompson, Georgia which is approximately 50 km away from the Plant Washington site. These emissions were based on actual emissions from the plant provided by the Georgia EPD in their modeling database spreadsheets. A review of the permit application on which the database is based confirms that the modeled emissions are at or below the reported actual values in the original April 1999 permit application. The modeled values are therefore conservative.

The minor source PSD baseline date for SO_2 in Washington County is October, 2000, which was triggered by the submittal of the first PSD permit application for SO_2 emissions in the county (Duke Energy Sandersville LLC). All emissions source that had increases in actual emissions after the minor source deadline were included in the PSD increment modeling. The SO_2 NAAQS and PSD Increment modeling only included those receptors within the projects SIA (5.4 km) which does not extend beyond Washington County.

In some cases the AERMOD model indentifies velocities and temperatures which may be outside the expected range for the parameter. These values were verified and corrected where necessary in the refined modeling.

5. The Class I area impact assessment submitted by the applicant on August 4, 2009, indicated an SO_2 emission limit of 0.08 lb/MMBtu over 24-hours for the main boiler will result in project impacts in all PSD Class I areas of less than the significant impact levels. This result would eliminate the need to perform cumulative PSD increment modeling. Review of the emissions provided in revised Table 5-3 (included with this letter) shows the only change in SO_2 emissions were those for the annual analysis, which showed an increase from 54.38 g/s to 120.83 g/s. Since there appears to be no change in the 3-hour and 24-hour modeled emission rates, the proposed limitation and modeling results should be explained. This discrepancy should be explained in the final determination.

Class I Area Impact Assessment

The EPA comments that the Class I Area impact assessment submitted by the applicant on August 4, 2009 indicated that a proposed 24-hr emission limit for SO_2 was utilized in the Class I modeling assessment, and use of this modeled rate resulted in modeled impacts at all Class I Areas evaluated less than the Significant Impact Levels (SILs), eliminating the need for PSD increment modeling. The EPA further comments that there appears to be a discrepancy in the indicated modeled rates in Table 5-3, and these discrepancies should be explained.

Footnote 1 to Table 5-3 addresses EPA's comment on this issue, and was included to attempt to alleviate confusion on this issue. Different modeled rates were used in the Class II (AERMOD) modeling assessments versus the Class I (CALPUFF) modeling assessments. Footnote 1 reads as follows;

[1] SO2 3-hr, 24-hr, and annual models in AERMOD conservatively evaluated utilizing the proposed 3-hr BACT emission limit of 959 lb/hr (120.83 g/s). Class I screening analysis evaluation (in Section 7.3) utilized a proposed 24-hr SO2 emission rate of 0.08 lb/MMBtu in the evaluation of the 24-hr SO2 impacts to the defined Class I Areas. Both the 3-hr and annual SO2 Class I screening analysis utilized the proposed 3-hr emission rate limit of 959 lb/hr (120.83 g/s).

The modeling input files provided on the CD attached to the August 4, 2009 letter will confirm that the modeled emission rate for the main boiler within the Class I Area evaluations for SO_2 on a 24-hr basis are consistent with a 24-hr emission limit of 0.08 lb/MMBtu.